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Postoperative responses in 'prepared' child after cardiac surgery[1]

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SUMMARY Postoperative reactions of children and adolescents realistically prepared for cardiac surgery were analysed for acute and long-term responses. No cases of delirium or psychoses occurred in the 60 children while they were in hospital. Fifty sets of parents and children answered questionnaires 6 months to 4 years after operation (36 under 1 year, 8 from 1 to 3 years, and 6 over 3 years) and assessment of these showed only one long-term reaction. Evaluation of reactions is presented by age and in detail. The children aged 2 to 7 years had the greatest number of negative reactions and the only long-term reaction also came from this group. Children 8 to 11 years of age had the least number of negative reactions and the highest number of positive gains. Adolescents, 12 to 19 years of age, were often concerned with their body image (wanted to be considered 'well', resented the scar, etc). From the standpoint of emotional stability and after effects, the 8 to 11-year-old group seemed to do best.

The reactions of children to a period in hospital, with or without operative procedures, have been widely reported and analysed (Levy, 1945; Prugh *et al.*, 1953; Robertson, 1958; Bowlby, 1960; Sipowicz and Vernon, 1965; Skipper and Leonard, 1968; Visintainer and Wolfer, 1975). The acute changes in personality while in hospital (depression, withdrawal, and anger) and continuing problems later (phobias, neuroses, and regression) prompted many changes in the handling of the child admitted to hospital. Visiting privileges of the parents were increased, and eventually mothers were allowed to stay in the room with the child. Preparation of the parents and the child was also improved both before and during the hospital stay. The importance of honesty in dealing with a child quickly became apparent. With these changes, the child was more able to cope with the hospital admission and negative reactions decreased. Though the type of operation *per se* did not seem to influence the postoperative reactions in children, there have been more grossly abnormal responses after heart operations in both children and adults, particularly after procedures requiring the heart-lung machine (Edington, 1968; Danilowicz and Gabriel, 1971; Abram, 1973; Kaplan *et al.*, 1974).

Although it is probably idealistic to think that a stay in hospital with or without operation can occur with no adverse reactions, it should continue to be the aim of all physicians to minimise the number and severity of negative responses as well as to encourage those experiences that can be maturing and of positive value. This report assesses the acute and chronic responses in a population of 'prepared' children who were admitted for some form of cardiovascular operation (40 for open heart surgery and 10 for thoracotomy). The realistic method of preparation was chosen over such methods as play therapy and fantasy evaluation because of the nature of the referral service and the limitation of time.

Patients and methods

Sixty patients who had cardiac operations between 1970 and 1975 were studied. Infants were excluded, but otherwise no special selection was used. Of these 60 patients, 50 answered questionnaires relating to their stay in hospital and their postoperative reactions. Essays were written by several of the children and further information was obtained by telephone and by office visits. Because of the mode of referral, the major follow-up had to be accomplished by questionnaire in spite of the recognised drawbacks of this method. Five forms were returned

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Table 1 *Children's reactions to operation: characteristics of patient population (50 patients)*

Sex		*Age (y)*		*Race*	
Male	22	2- 7	26	Black	3
Female	28	8-11	12	White	46
		12-19	12	Oriental	1
Economic status		*Residence*		*Families*	
Low	8	New York City	37	Intact	47
Welfare	3	New York State	13	Divorce	2
Middle	39			Father left	1

because the family had moved and an additional 5 were not answered.

Apart from excluding gross psychiatric pathology in the children, no specific evaluation of the child's personality was made before the operation. As far as any child with heart disease can be normal, these children seemed to satisfy those criteria (Green and Levitt, 1962; Linde *et al.*, 1971).

Of the 50 who answered, a relatively consistent population emerged, mainly white, middle to upper middle class, and from the metropolitan New York City area (Table 1). All children spoke and understood English. The only communication problems were with the younger children and with 5 patients who had some degree of retardation (a 4-year-old trisomy Down's boy, educable; a 5-year-old Down's translocation mosaic girl with normal IQ and learning disabilities; a 4-year-old girl and a 19-year-old boy with 'brain damage' at birth, both educable; and a 6-year-old trisomy Down's girl functioning at a 3-year level).

Of the 50 families, only 3 were not intact. Two sets of parents were undergoing divorce procedures: the parents of a 2-year-old were still living together, apparently amicably, and the parents of an adolescent girl where the father was out of the house. The third family was that of a black adolescent girl whose father had left the household many years before, lived in Michigan, but continued support to the family.

The 60 patients were examined initially for acute postoperative reactions; no psychosis or delirium was noted in any child. (This is in contrast to an earlier study by Danilowicz and Gabriel (1971) of 68 children, of whom 4 had acute reactions, where preparation of the children was sporadic or non-existent. However a control series was not studied and comparison with this earlier group is not justified.) In the present group of 60 children, manifestations of anger, dependency, and non-co-operation were noted postoperatively but there were no major somatic reactions and no psychoses or episodes of delirium.

Table 2 *Preparation of child for cardiac surgery*

Preoperative: outpatient department

(1) Arrange visit to ward before admission if child not previously admitted to same hospital
(2) Discuss with child and parents hospital stay and operation in general terms; encourage questions and try to decide whether any problems exist
(3) Stress importance of truthfulness to parents regarding preparation; encourage mothers of younger children to make arrangements so they can share a room during admission
(4) With older children, get them to participate in some decisions; do not spring any 'surprises' on them
(5) Involve social service early if any financial, family problems come up

All of the present group of children were prepared in a similar way (Table 2), with most of them having had cardiac catheterisation in the hospital where the operation was to be performed. In cases where this was not true, the parents and child could visit the ward at the time of a preoperative examination or at another prearranged time. The parents were told to be honest with the children and to seek help from the doctor or nurse if questions were asked that they could not deal with. The nursing staff and technicians explained all the procedures at a level appropriate to the age of the child. Older children were involved in the decision regarding the operation as much as possible and the time interval between preparation and operation was kept short (about 2 to 4 weeks) with younger children whose time concepts are limited. Once admitted to the hospital, the children were acquainted with the ward, recovery room, and intensive care unit (Table 3). Procedures and equipment, such as deep breathing (blow bottles and blow toys for younger children and intermittent positive pressure breathing for older children and adolescents), suctioning, intravenous lines, urinary catheters, face masks, oxygen tents, and monitoring devices, were shown and described to the children before the operation. One of the authors was closely involved with the preparation and assessed its adequacy. The parents and children were considered 'well prepared' and, of the 50 answers received, 49 parents agreed with this evaluation. One set of parents felt the child was well prepared but that their responsibilities about

Table 3 *Preparation of child for cardiac surgery*

Preoperative preparation: in hospital

(1) Show child and parents ward routines; show intensive care unit (oxygen masks, tents, monitoring devices, etc.)
(2) Discuss at level appropriate for age details of postoperative period; provide time for questions; with older children and adolescents, a time for questions away from parents is often appreciated
(3) Explain all procedures (what and why) before doing them
(4) Arrange for demonstration of respiratory therapy (blow bottles and blow toys for younger children; IPPB for older children); stress importance of this to earlier discharge and fewer complications

Table 4 *Preparation of child for cardiac surgery*

Postoperative preparation: in hospital
(1) Encourage and support parents in staying with child as needed
(2) Continue to explain all procedures
(3) Encourage child to talk it out and offer proper support; once child is ambulatory on ward, 'play-therapy' and 'acting out the operation' can be useful
(4) Try to keep stress on parents to a minimum; panic in parents is quickly conveyed to child (information about occurrence of low grade fever, pulmonary secretions, wound pain, when given ahead of time makes these incidents much less threatening when they occur)

visiting and care to the child after operation were not explained in enough detail to make them feel comfortable. Mothers usually shared a room with the younger children and some member of the family was present for most if not all of the day. Parents were told to be present before the child went to the operating room and again when the child awoke in the recovery room after the operation (Table 4). The recovery room visiting time was limited, but luckily most children (42/50) spent only 4 to 12 hours there (Table 5). In the intensive care unit, the visiting time was open only to the parents (exceptions were made as indicated by the family constellation), but there was no time limitation and mothers could stay at the bedside as long as they wished. Time in the intensive care unit was also usually short (1 to 3 days, Table 5) though 2 children stayed much longer. At the time of discharge from hospital, the parents were told to expect some changes in behaviour of the children for a time. They were reassured that these changes were usually normal and were told to call if any problems arose (Table 6). Some leniency was encouraged but lack of discipline was not. The questionnaires were sent out no earlier than 3 months after the operation so that continuing reactions would be identified. If reactions were still present at the time of the return of the questionnaire, further assessment was undertaken.

Analysis of parent's and children's initial responses (Table 7)

Parents were almost unanimous in stating that the waiting during the child's operation was the worst part of the stay in hospital (39/44; 6 sets of parents did not reply to this question). For others, the worst time was seeing the child in the recovery room (4) and having the child return to the operating room for bleeding (1). For the 26 children aged 2 to 7 years, the worst portions were reported as follows: needles (12), suctioning (4), separation from parents (4), intensive care unit/recovery room (3), apprehension (2), and disappointment with the

Table 5 *Hospital time of patient population*

Days in RR	*No.*	*Days in ICU*	*No.*	*Days on ward*	*No.*
Under 1	36	1	8	10	30
1-2	12	2	32	10-14	16
2-7	1	3	6	14-21	2
Over 7	1	4-7	3	Over 21	2
		Over 7	1		

RR, recovery room; ICU, intensive care unit.

Table 6 *Preparation of child for cardiac surgery*

Postoperative instructions at discharge
(1) Prepare parents for some personality changes, regressive behaviour; tell them to allow for some of this but not to drop discipline completely
(2) Get child to return to as normal activity as physically possible; try to allay anxieties about incision to both child and parents
(3) Ensure easy access by phone and/or clinic visit as needed
(4) Make sure school has all needed information about older child so that return is facilitated

Table 7 *Postoperative reactions*

Reactions	*2-7 years (n = 26)*	*8-11 years (n = 12)*	*12-19 years (n = 12)*
Immediate postoperative delirium/psychosis	0	0	0
What was worst? (immediate)			
Needles	12	3	0
Suctioning	4	0	0
Separation	5	0	0
ICU/RR	3	0	3
Apprehension/anxiety	2	3	4
Pain	0	2	4
'Hospital food'	0	0	1
Not answered	—	4	—
Discussion of operation?			
Yes	26	12	9
No	—	—	2
±	—	—	1
Reaction to scar			
Showed off; proud of it	16	6	0
Disliked	3	2	3
No mention made	7	4	9
Positive responses	9	12	6
More sure of self	0	6	2
Better grades, concentration	3	1	2
More mature	5	3	2
Less afraid of doctor	2	2	0
Loss of enuresis	1	2	—
Physical improvement	14	9	8
Negative responses	26	2	9
Withdrawn	0	1	4
Seeking praise, notice	0	0	3
Resentful of parents	2	0	2
Sleep disturbances	13	1	0
Bedwetting	3	0	0
Apprehensive, fearful	10	0	0
Demanding of parents	10	0	0
Regressive behaviour	13	0	0
Long term reactions	1 (1 year)	0	0

operative result (1). In this age group, parental interpretation often blended with or overshadowed the responses of the children. In the very young children, the parental responses replaced the children's responses in some instances. For the 12 children who were between 8 and 11 years old, the worst part was reported as follows: needles (3), anxiety/apprehension (4), intensive care unit/recovery room (3), and pain (2). For the patients aged 12 to 19 years, the worst part was pain (4), anxiety/apprehension (4), intensive care unit/recovery room (3), and 'hospital food' (1). Fear of physical threat and separation was more prominent in the youngest group while apprehension and physical pain seemed more prominent in the older groups.

Analysis of responses after discharge (Table 7)

Talking about the operation and stay in hospital was a common finding in and out of the hospital and was present in all age groups (Danilowicz and Gabriel, 1976). With the younger children (2 to 7 and 8 to 11 years), open and free discussion was invariable, with 22 of the 38 children being proud of and showing off the scar. Five children in these younger groups disliked the scar while others made no special reference to it. In the adolescent group, the scar was disliked by 3 and ignored by 9. Open discussion was absent in 3 adolescents, 2 girls refusing to talk about the operation at all and 1 boy being reticent about the topic. One adolescent, a 16-year-old black girl, on the other hand, was very introspective and communicative; she subsequently sent a long poem that she had written about her illness and operation to her cardiologist and surgeon (Danilowicz and Gabriel, 1976).

From the answers received to the questionnaires, we were able to place the reactions into a negative and positive group. A response was considered negative if it interfered with the child's normal life (for example fear of white coats, withdrawn and frightened, overdemanding of parents with fear of strangers, etc.) or caused a disruption of previously normal behaviour patterns (for example sleep disturbances such as nightmares or night terrors, regressive behaviour such as bedwetting, bottle feeding, baby talk, or clinging behaviour). Positive responses were divided into two categories. In one was the direct physical improvement seen in children who were symptomatic before the operation (better exercise tolerance, better weight gain, fewer infections). Though physical improvement may have contributed to the other positive gains, this aspect was not used in the comparison since it was not specific for any group. The second category of positive reponses included those aspects of maturing behaviour which occurred in spite of (or perhaps because of) the stay in hospital. For example, parents mentioned that the children were more sure of themselves, related to their doctors better, were doing better socially and intellectually in school, stopped bed wetting, etc. The incidence of negative and positive reactions in the 3 age groups was compared using the χ^2 fourfold table.

Although negative responses were expected and elicited in all groups, the infrequency of negative responses in the 8 to 11-year-olds (2/12) was impressive compared with the 2 to 7-year-olds ($\chi^2 = 17$; $P < 0{\cdot}01$), and compared with the 12 to 19-year-olds ($\chi^2 = 14{\cdot}2$; $P < 0{\cdot}01$). All 26 of the 2 to 7-year-old group had some negative reactions as did 9/12 of the adolescents. Positive responses (other than physical improvement) were reported in all age groups, but again the middle age group stood out with all 12 reporting positive responses (even in the 2 where negative responses were also noted), compared with the 2 to 7-year-olds ($\chi^2 = 19{\cdot}4$; $P < 0{\cdot}01$), and compared with the adolescents ($\chi^2 = 5{\cdot}5$; $P < 0{\cdot}01$). Nine of the 26 youngest children had some positive responses reported as did 6 of the 12 adolescents. Though these occur in children as a result of the natural process of maturing, their occurrence during a stay in hospital shows that even this experience can be integrated into the maturing process. From our observations, the middle group seems most likely to cope with a stay in hospital in this manner.

Of the negative reactions, most had disappeared by 1 to 2 months after operation. Sleep disturbances (seen in half of the 2 to 7-year-old group) included night terrors, nightmares, difficulty in falling asleep without a parent in the room, wishing to sleep with the parents, return to the need for a security object or light, and restless sleep. These subsided by 1 to 2 weeks after discharge, though 1 child continued to have nightmares for 1 month. This happened in a 4-year-old girl whose stay in hospital was prolonged to 8 weeks, 2 weeks of which were spent on a respirator with a tracheostomy. She was also the only child with a long-term reaction (1 year). After discharge, this child regressed to the bottle and used baby talk again. She refused to stay with baby sitters (no problem before operation) and demanded full attention from her mother. Night terrors went on for 2 weeks with nightmares and restless sleep for an additional 2 weeks. About 6 months after operation the child's physical condition was noticeably improved from her preoperative state and with this the girl began to regain her independence. She subsequently made excellent gains in learning and by 18 months after operation she began to talk proudly about her operation, how her heart was fixed, and how well she was doing because of the operation

('delayed discussion'). Her subsequent entry into school was no problem and she continued to do well. In contrast to this child, the 6-year-old boy who had to remain in hospital for 6 weeks for treatment of bacterial endocarditis (Danilowicz *et al.*, 1974) had only minor sleep disturbances for the first week after discharge. However, he was never critically ill and his major problem was that of an intravenous line for 4 weeks. This did not stop him from walking; he was able to attend school, go to the playroom, and take part in scheduled ward activities. This boy, therefore, had little of the isolation that the 4-year-old girl had to endure and he did not sustain nearly as much physical trauma.

Discussion

Over the past 40 years, there has been a growing awareness among all physicians of the needs of children who must stay in the hospital for greater or lesser periods of time. The major problems associated with hospital stay for the child and adolescent are those of a dependent individual separated from parents and of physical trauma (pain, coercion) at an age when ability to deal with these situations is still limited. While the issue of parental loss has been handled by more flexible visiting procedures, the problem of physical trauma with its short and long term sequelae is more difficult. Though many surgical procedures can be dealt with by short stays in hospital, more complex ones such as cardiac operations require longer admissions, with all the attendant emotional problems.

It is obvious that medicine, apart from adequate analgesia, can do little to modify the truly painful, invasive, and assaulting qualities of major surgery. In fact, after cardiac operations, the patient is called upon to cough and breathe deeply in spite of the pain incurred as well as to co-operate with very frightening procedures such as suctioning. Our efforts to prepare children and adolescents adequately for such experiences were rewarded in this group by the absence of grossly abnormal acute reactions as well as relatively short-lived 'chronic' responses. While a realistically prepared child is told what to expect, it is important to reinforce the information before actually carrying out a procedure. After the operation, there appears to be a need for the children to integrate all the experiences over a longer period of time. The children apparently accomplish this using two major mechanisms. The first is through a period of regressive dependent behaviour which is then followed by the second, a longer period of 'working through' by showing off the scar and talking about the operation and stay in hospital. This type of behavioural response has been previously described by Anna Freud (1946) and Robertson (1958).

There do appear to be several factors which may impair the total adjustment process. A repressing, denying attitude by the parents in the early postoperative period may slow adjustment by not allowing adequate discussion and working out of emotional involvements. The presence of another individual who can help the child (for example the play therapist) is useful in these instances. The other more difficult problem is that of the medical complication which prolongs convalescence. The stresses of medical complications put both the child and the family at greater risk and demand much more support from the doctors and staff.

Some recognition must be given to the special problems of the normal adolescent, which are related to the difficulties experienced by this age group (Blos, 1962; Erikson, 1963). While the events surrounding and subsequent to surgery appear to be handled in the same way as in the younger children, there may be a greater withdrawal by the adolescent, who is more interested in independence and becomes resistant to outside authority. Concern about body image is seen in the adolescent's anxiety about scarring and disfigurement. Sexual identity and attractiveness are a preoccupation of the normal adolescent and may add to the problems that arise during the stay in hospital. The 'working through' may be a more prolonged process in this age group.

Conclusions

The responses in children realistically prepared for their operation seem relatively mild and rarely last beyond one month after discharge. Prolonged reactions may occur in children having a complicated and medically difficult postoperative course, particularly if significant parental separation or verbal isolation occurs in a younger child. Although the numbers are small, the responses of the 8 to 11-year-old group are significantly better and suggest that, if a choice of time is possible, this age may be a better time for elective surgery. Adolescents and the 2 to 7-year-old children cope with the threat to mind and body less well and are more prone to negative reactions even with adequate preparation. There seems to be no preparation that can totally protect the child who develops severe complications with a resultant prolonged stay in hospital and multiple manipulations. Support of both the child and the parents is important when this occurs. Postoperative discussion and working-through appear to be essential mechanisms used by children to integrate and deal with the total experience of surgery and hospital admission. Any environment that makes it easier for the child to

work this out (puppet play, play acting, school show and tell, co-operative and tolerant parents) will probably contribute to an earlier integration and an earlier return to normal activities.

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